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GUIDELINES FOR
RESPONSE TO ENVIRONMENTAL
AND
ENVIRONMENTAL HEALTH EMERGENCIES

November 1978

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Ministry
of the
Environment

The Honourable
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NOVEMBER, 1978

DISCUSSION

In dealing with environmental health emergencies, the Ministry is charged with the dual responsibility of environmental and public health protection.

In an emergency such as a fire, transportation accident, major spill, etc., the immediate problem is one of definition, i.e., does the incident constitute an extreme environmental or public health hazard. The second issue involves the quantification and assessment of the hazard. Finally, on the basis of these assessments, control and abatement action must be determined.

It is the purpose of these guidelines to provide direction to Ministry staff in responding to environmental health emergencies in these three areas and to be supplementary to the Province of Ontario Contingency Plan for Spills of Oil and Other Hazardous Materials.

LEGISLATION

The Environmental Protection Act and The Water Resources Act require that spill incidents and other accidental emissions to the natural environment be reported to the Ministry forthwith (Section 15, The Environmental Protection Act and Section 32b, The Water Resources Act).

The fundamental responsibility for the alleviation of damage to the natural environment rests with the party responsible for the emission.

In the event that corrective action is not taken then the Minister may authorize that clean-up action be taken and the costs recovered from the responsible party. This provision has seldom been necessary in spill incidents in the past but it should be noted that this is the only authority the Ministry has to direct what clean-up action should be taken.

In the case of public health protection, the definition of the environment is not clear. It is the position of the Ministry of Labour that anything outside of the workplace, as defined by health and safety legislation, is the responsibility of the Ministry of the Environment. If this is the case, then clean-up or other action necessary to ensure public health protection becomes the responsibility of the party responsible for the emission and ultimately the Ministry.

General authority for the evacuation of individuals or communities in the event of an emergency rests with the municipality. Emergency Planning Officers within individual municipalities are listed under Special Contact List III-4 in the Ontario Contingency Plan. These individuals are responsible for the development of peacetime emergency plans which include provisions for the evacuation of people potentially affected by natural or man-made disasters. Local fire departments, in the case of fire emergencies, and Medical Officers of Health, in the case of public health emergencies, may also authorize public evacuation.

In all cases, evacuation is effected through local or Provincial police forces. The Ministry's role in emergencies which may dictate evacuation is therefore advisory.

DEFINITION OF AN ENVIRONMENTAL EMERGENCY

There are three classes of potential environmental emergency. These are:

1. Spills of solids or liquids;
2. Emissions of gaseous products into the air from a specific source;
3. Fires and explosions resulting in emissions of gaseous contaminants, liquids and combustion products.

In the context of damage to the natural environment, the spill of almost any material that is capable of being toxic to plant and animal life must be regarded as an environmental emergency. Such materials are reasonably well defined and procedures and spill response mechanisms have been established through the Province of Ontario Contingency Plan for Spills of Oil and Other Hazardous Materials.

Less clear is the definition of materials which may constitute a public health hazard. Many substances which are toxic to plants and animals must also be regarded as hazardous to man and in most instances spills of materials that constitute an environmental emergency will also constitute a public health hazard. It then becomes necessary to assess the

degree of hazard and what priority is assigned to public health protection as well as environmental protection.

Information sources that may be consulted in order to make this assessment include:

Ministry of Labour

Occupational Health Branch
Tel: (416)965-3211*

Special Studies and Services Branch
Tel: (416)965-2493*

Ministry of the Environment

Waste Management Branch
Waste Systems Planning Section
Tel: (416)965-2214*

Pollution Control Branch
Pesticides Control Section
Tel: (416)965-2401*

* Working hours only

Annex III - Province of Ontario Contingency Plan
for Spills of Oil and Other Hazardous
Materials

Canadian Chemical Producers Association
- Transportation Accident Emergency
Assistance Plan

For any transportation emergency involving chemicals,
phone the nearest of the following 24-hour-per-day
emergency numbers:

SHAWINIGAN, QUEBEC	(819)537-1123
VALLEYFIELD, QUEBEC	(514)373-8330
MAITLAND, ONTARIO	(613)348-3616
NIAGARA FALLS, ONTARIO	(416)356-8310

SARNIA, ONTARIO	(519)339-3711
COPPER CLIFF, ONTARIO	(705)682-2881
EDMONTON, ALBERTA	(403)477-8339
VANCOUVER, B.C.	(604)929-3441

References:

Manufacturing Chemists Association

- Chemical Safety Data Sheet

Dangerous Properties of Industrial Materials

- by N. Irving Sax

Handling Guide for Potentially Hazardous Commodities

- Railway System Management Association

Hazardous Materials - Emergency Action Guide

- U.S. Department of Transportation

Hazardous Chemicals Data

- National Fire Protection Association

EMERGENCY PROCEDURES

In keeping with the response operations identified in the Province of Ontario Contingency Plan, emergency procedures should proceed in four phases, which are not necessarily exclusive but break down the elements into a logical sequence.

These are:

1. Discovery and Alarm;
2. Evaluation;
3. Containment and Countermeasures;
4. Clean-up and Disposal

DISCOVERY AND ALARM

Notification of an environmental emergency may result from mandatory reporting by the responsible party, by surveillance activities or from reports from other government agencies, the media and the general public.

Initially, contact should be made with the appropriate Ministry Regional or District Office via the contact list in Annex I of the Contingency Plan. Following this, a preliminary evaluation of the nature, volume and location of the emergency should be made. Based on this preliminary assessment, further contacts with technical information sources within various agencies may be necessary to determine the magnitude of the hazard and whether it is primarily an environmental emergency or one involving concerns for occupational or public health.

Contacts listed in Annex III of the Contingency Plan under the Ministry of Labour, Occupational Health Protection Branch, Ministry of the Environment, Pesticides Control Service and Ministry of Health, Community Health Division, can provide technical expertise to assess the nature of the health hazard.

In addition, technical assistance is available from Ministry of the Environment, Waste Management Branch, Waste Systems Planning Section and the Canadian Chemical Producers Association via TEAP.

EVALUATION

The initial evaluation of the emergency should consider the toxicity of materials or contaminants involved and the quantity involved in order to assess the magnitude of the emergency and the potential impact on public health and safety and/or the environment.

Toxicity

The principal criterion likely to be used in the assessment of an environmental emergency involving spills or emissions of contaminants is acute toxicity; that is, the toxicity of the contaminant likely to result in lethality in laboratory animals, fish or other test organism.

In addition, because the effects of some contaminants may be delayed depending upon dose-response relationships, such properties may introduce an additional level of concern with respect to public health protection.

Generally, all compounds which exhibit acute toxicity must be regarded as potential environmental contaminants. The toxicity hazard rating system that is included in "Dangerous Properties of Industrial Materials", by N. Irving Sax, provides a useful measure of the relative hazard of industrial compounds. The description of this rating system is as follows:

- 0 = NONE:
 - a) No harm under any conditions;
 - b) Harmful only under unusual conditions or overwhelming dosage.
- 1 = SLIGHT: Causes readily reversible changes which disappear after end of exposure.
- 2 = MODERATE: May involve both reversible and irreversible changes not severe enough to cause death or permanent injury.
- 3 = HIGH: May cause death or permanent injury after very short exposure to small quantities.
- U = UNKNOWN: No information on humans considered valid by the authors.

These criteria are applied in four general categories of exposure:

Acute Local - Single exposure lasting seconds, minutes or hours via the skin or mucous membranes.

Acute Systemic - Absorbtion into the body by inhalation, oral ingestion or through the skin via a single exposure lasting seconds, minutes or hours or via a single oral dose.

Chronic Local - Continuous or repeated exposure extending over days, months or years via the skin or mucous membranes.

Chronic Systemic - Absorbtion into the body by inhalation, oral ingestion or through the skin via continuous or repeated exposure extending over days, months or years.

This rating system is primarily related to the assessment of occupational health hazards but is a useful basis for the evaluation of public health and environmental hazards.

Coupled with this evaluation, is a need for specific data on acceptable levels of contaminants in the workplace and the general environment. Reference sources for this information include :

- Ministry of Labour - Occupational Health Branch and Special Studies and Services Branch
- Lists of TLVs (Threshold Limit Values) published by the American Conference of Government Industrial Hygenists
- Regulation 15 of The Environmental Protection Act

- Guidelines and Criteria for Water Quality Management in Ontario

Relevant contacts in the Ministry include:

- Air Resources Branch - Criteria Development and Program Planning
- Water Resources Branch - Limnology and Toxicity
 - Planning and Co-ordination
- Pollution Control Branch - Pesticides Control Section
 - Municipal & Private Section
- Waste Management Branch - Waste Systems Planning

Quantification and Assessment

Having identified the nature of the emergency and the toxicity and/or environmental or health criteria or standard for the contaminant(s) involved, it becomes necessary to determine the rate of emission and concentration of the contaminants in the immediate vicinity of the emergency.

At the present time, there is limited capability for Air Resources Branch or Laboratory Services Branch to provide emergency analytical service. In fact, there is little or no capability to provide instant analysis of air or water contaminants likely to be involved in environmental emergencies.

Initially, some attempt should be made to assess the quantity of material that has been or is being emitted during the emergency. The capacity of the vessel involved or other simple means can be used to estimate the quantity of emission. This, in conjunction with some knowledge of the volatility

and/or solubility or miscibility in water of the material, can be used to estimate concentrations and potential exposure in the vicinity of the emergency.

These crude assessments can then be used to determine the need for more precise analytical capability, the need for evacuation or protection of workers and the general public in the area and the need for clean-up action versus dispersion of the material into the environment.

CONTAINMENT AND COUNTERMEASURES

The initial response to an environmental emergency should be to begin countermeasures as soon as possible to alleviate environmental damage. However, in cases where the emergency poses an immediate local health hazard, consideration must be given to dispersion into the environment to alleviate the health hazard.

Public health protection and the prevention of occupational exposure to extremely hazardous materials must take precedence over environmental protection.

Abatement of Gaseous Emissions

There are basically three approaches to deal with emergencies involving gaseous emissions. These are:

1. Evacuation of persons in the immediate vicinity of the emission if it poses a significant public or occupational health hazard;

2. Control or isolation of the source of the emission;
3. Dispersion of the emission into the air or into water.

Abatement of Liquid Spills

Options for the control or abatement of liquid spills are varied depending on the nature of the material.

Again, the initial response must be to protect public health in the event that the spilled material constitutes a significant human health hazard.

Initially, attempts should be made to impound or contain the spilled material. If this is successful, the spilled material may then be transferred to suitable containers for safe disposal.

Spilled material should be prevented from gaining access to potable water supplies and, in the event that this is not possible, water supply systems and householders should be notified of the hazard and the supply temporarily interrupted.

At the same time, other contaminated materials such as soils, etc., should be collected if there is likely to be significant improvement in environmental damage to be achieved by removal of these materials for alternative disposal.

In the event that collection or removal of the spilled material is not practicable or technically feasible, attempts should be made to neutralize or stabilize the spilled material in situ or on the site of the spill. This should be given very careful consideration since problems of mixing, proportioning and subsequent long-term impact of the added chemicals make it difficult to carry out in situ neutralization or chemical treatment efficiently.

Containment and Countermeasures at Fires

A major fire constitutes a unique environmental and public health hazard. By its very nature, a fire results in environmental damage which can only be alleviated by extinguishing the fire. Also, the water used for this purpose may pose a further danger to the environment.

Environmental hazards associated with fires result from contamination being flushed from the fire by fire hoses and the emission of gases, vapours and products of combustion into the atmosphere.

In general, there is nothing that can be done to deal with gaseous emissions except permit their dispersion into the atmosphere. In situations where the gases or vapours pose a health hazard, workers, firefighters and the general public should be protected from exposure through isolation from the source and/or the use of protective equipment.

Run-off and liquid drainage can be contained by emergency impoundments or catch basins where this is appropriate and provided it does not impede extinguishing the fire.

In general, prior knowledge of the nature and location of hazardous products is an essential element in dealing with environmental health emergencies resulting from fires. With this information, it is possible for firefighters to be prepared to fight the fire in a manner which minimizes occupational health risks, environmental damage and public health effects.

Equipment containing hazardous materials should be clearly identified.

All individuals who may be involved in firefighting and clean-up should be made aware of the nature and location of the hazardous materials.

All individuals who may be involved in firefighting and clean-up should be made aware of any distinctive odours or vapours which may be indicative of a hazardous situation.

Firefighters should use self contained breathing apparatus and conventional firefighting clothing.

Normal building evacuation procedures should be applied. Evacuation from the broader area of the affected district should be advised where an extreme health hazard exists.

Re-entry to a space following a fire involving hazardous materials without self-contained breathing apparatus should only be permitted after the space has been well ventilated and the ambient temperature reduced to normal.

Persons involved in clean-up of buildings, etc., after a fire involving hazardous materials should wear appropriate protective clothing.

Contaminated impervious surfaces such as walls, ceilings, hoses and firefighting equipment should be cleaned using wipers and solvents where appropriate to minimize losses to the environment.

Contaminated liquids, materials, soils and other collected contaminated matter should be disposed in an environmentally acceptable manner at an authorized site.

PUBLIC INFORMATION

In keeping with the philosophy incorporated into the Province of Ontario Contingency Plan, when a pollution incident occurs, the public must be provided with timely, accurate information on the nature of the incident and the steps being taken to deal with the problem.

In the period immediately following a spill incident or other environmental emergency, the Ministry's Information Services Branch should be advised and be closely involved in the Ministry's response in order to facilitate the transmittal of information to the public and to establish liaison with public information staff of other agencies that may be involved.

Further, in keeping with the Provincial Spill Contingency Plan, during major incidents the Ministry's Information Services Branch will clear all News Releases with the predesignated "On-Scene Co-ordinator" named in the Plan.

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